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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/726,232

12/01/2003

Brian H. Moeckly

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EXAMINER

VIJAYAKUMAR, KALLAMBELLA M

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1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/726,232	Applicant(s) MOECKLY ET AL.	
	Examiner KALLAMBELLA VIJAYAKUMAR	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 and 32 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-25 is/are allowed.
- 6) ☒ Claim(s) 26 and 32 is/are rejected.
- 7) ☒ Claim(s) 27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/20/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

- Claims 1-27 and 32 are currently pending with the application. Claims 1, 14, and 26 were amended. Claims 28-31 are cancelled. Claims 13 and 24 were previously allowed.
- The examiner has considered the IDS filed 12/20/2007.
- The limitation of “physically separate reaction zone and depressurized deposition zone” in claims 1, 14 and 26 is supported by Fig-1 and the limitation of negligible amounts of oxygen in these claims is supported by specification (Pg-15, Para-0055).
- Applicants argument that metallic vapors could not be introduced into the Apparatus of Matijasevic et al (US 6,527,866) has been addressed in the following rejection under 35 USC 103(a).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 26 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Bozovic et al (US 2001/0036214; PTOL 892, 10/11/2006).

Bozovic et al teach depositing the components of an oxide superconductor by PLD deposition of HTS components over a substrate in a depressurized zone (open-position), moving/ shuttling

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the substrate to a reaction zone that is pressurized (closed) forming a precursor, repeating cycle and then annealing under high TI or Hg pressure in the reaction zone forming the TI or Hg-superconductor (closed-position) on a layer by layer basis (Abstract, Fig-I, Para 0046). The prior art further teaches depositing the precursors of HTS-oxide in the first stage and annealing with TI or Hg vapor in second stage (P-0046, Cl-2, Ln 6-11). All the limitations of the instant claims are met.

The reference is anticipatory.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 26 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Matijasevic et al (US 6,527,866; PTO-892, 04/17/2007) in view of Bozovic et al (US 2001/0036214; PTOL 892, 10/11/2006).

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Matijasevic et al teaches an apparatus and method of making thin films of superconducting materials over a substrate by depositing the metallic components/precursor in a plurality of depositing zones and reacting them in same number of reaction zones by alternating/rotating the substrate between these zones and finally with a gaseous element such as oxygen in a reaction zone forming the thin film of the compound (Abstract; Fig 1-10; CI-1, Ln 27-45; CI-5, Ln 8-CI-10, Ln 44). The substrates included sapphire, silicon, alumina and magnesia (CI-3, Ln 66-CI-4, Ln 8). The thin film included CMR materials, superconducting YBCO and BSCCO, and a compound with the formula $A_{1-x}B_x$ (CI-3, Ln 26-42; CI-6, Ln 60-65). The pressure in the deposition chamber was about 0.0001-.01Pa and that of the reaction chamber was 0.5-20Pa (CI-5, Ln 15-17; CI-8, Ln 64-67). The prior art further teaches heating either the sample or entire zone in the range of 600-800C (CI-5, Ln 37-40). The prior art further teaches the apparatus and the process can be used with any material that can be evaporated and optimizing the relative sizes of the reaction and deposition zones based on the stoichiometry of a binary compound such as $A_{1-x}B_x$ (CI-6, Ln 32-33; 52-67). The prior art device used for operating the process steps is similar to that in the instant claimed process.

The prior art fails to teach a method of making superconductor film by reacting the precursor with gaseous metal in an atmosphere containing negligible amount of oxygen per the limitations of the instant claim-26.

In the analogous art, Bozovic et al teach depositing the components of an oxide superconductor by PLD deposition of HTS components over a substrate in a depressurized zone (open-position), moving/ shuttling the substrate to a reaction zone that is pressurized (closed) forming a precursor, repeating cycle and then annealing under high Tl or Hg pressure in the reaction zone forming the Tl or Hg-superconductor (closed-position) on a layer by layer basis (Abstract, Fig-I, Para 0046). The prior art further teaches depositing the precursors of HTS-oxide in the first stage and annealing with Tl or Hg vapor in second stage (P-0046, CI-2, Ln 6-11) i.e. no oxygen gas. Bozovic further teaches introducing oxygen and/or metallic vapors in to the reaction/closed zone as desired (Abstract). Bozovic also teaches that the difference between their apparatus and Matijasevic apparatus to be PLD deposition that could be carried out at higher

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pressures (P-0037) showing the equivalency between the apparatus. The HTS superconductors included HgBaCaCuO, TlBaCaCuO and YBCO (P-0032, 0035).

It would have been obvious to a person of ordinary skill in the art to substitute the targets in the apparatus and process of making HTS-superconductor film by Matijasevic et al with that of Bozovic et al as functional equivalents with reasonable expectation of success, because Bozovic teaches the similarities between the two apparatus, and both the prior arts have common utility in making HTS-oxide superconductor films over substrates. Further it would have been obvious to anneal the HTS oxide with the metallic vapor over the teachings of Bozovic because the species of oxygen of Matijasevic is encompassed by the genus of reactants of Bozovic that includes oxygen and/or metallic vapor.

Reasons for Indicating Allowable Subject Matter

The following is an examiner's statement of reasons for allowance:

Claims 1-25 are allowed as amended. Claim 27 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

An updated search did not result in any new prior art of record that either teaches or fairly suggest applicants method of making MgB₂ and thin films over a substrate by the combination of various steps and the materials processed therein. Further, applicants method with physically separate reaction and deposition zones wherein the gaseous metallic component is reacted in the reaction zone with the deposited components unexpectedly resulted in films with high temperature superconductivity (Spec, P-0056; Fig- 5-6) over the prior art films (Saito et al : Fig 2-3 and 5; and Shimakage – Fig-5).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KALLAMBELLA VIJAYAKUMAR whose telephone number is (571)272-1324. The examiner can normally be reached on M-F 07-3.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 5712721358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KMV/
April 26, 2008.

/Stuart Hendrickson/

Stuart Hendrickson
examiner Art Unit 1793